REMARKS

This Amendment responds to the Office Action dated February 12, 2007 in which the Examiner rejected claims 1-6 and 9-13 under 35 U.S.C. §103 and stated that claims 14-16 are allowed.

As indicated above, a minor informality in the specification has been corrected. Therefore, Applicants respectfully request the Examiner approves the correction.

As indicated above, claims 1, 3 and 13 have been amended in order to make explicit what is implicit in the claims. The amendment is unrelated to a statutory requirement for patentability.

Claims 1 and 3 claim an optical fiber holding device and claim 13 claims an optical dispersion-equalizer. The devices comprise an optical fiber having a grating, a strip-shaped member and a substrate. Claim 3 additionally claims a heater. Claim 13 claims additionally a heater, a heater control circuit, a peltier element, a temperature sensor, a peltier element control circuit and optical circuitry. The strip-shaped member has a rectilinear groove in which the optical fiber is accommodated. A gap is formed between a wall surface of the rectilinear groove and the optical fiber. A gel substance, which remains soft, contacts with the optical fiber and is filled in the gap. The substrate is provided for mounting the strip-shaped member and optical fiber or heater. A first positioning mark is provided on the substrate and a second positioning mark is positioned on the optical fiber, so that a) the grating is positioned on the substrate using the first and second positioning marks as claimed in claim 1 or b) the grating is positioned with respect to the heater using the first and second marks as claimed in claims 3 and 13.

Through the structure of the claimed invention having first and second positioning marks provided on the substrate and optical fiber which are used for positioning a) a grating on the substrate, as claimed in claim 1 or b) the grating with respect to the heater as claimed in claims 3 and 13, the claimed invention provides an optical fiber holding device and an optical dispersion-equalizer which facilitates positioning of the grating with respect to the heater and prevents polarization mode dispersion characteristics from being degraded without occurring dislocation of the grating from the heater. The prior art does not show, teach or suggest the invention as claimed in claims 1, 3 and 13.

Claims 1-6 and 9-13 were rejected under 35 U.S.C. §103 as being unpatentable over admitted prior art in view of *Chamberlain et al.* (U.S. Patent 6,411,746), *Lauzon et al.* (U.S. Patent 5,671,307) and *Koyabu et al.* (JP 3-134603).

Referring to FIG. 14, an optical fiber 1 is made of a core and a clad; a grating 2 is formed at a part of the core of the optical fiber and reflects an optical signal of a number of wavelengths; a heater 3 which is made of a thin film for heating the grating to a predetermined temperature distribution; and a substrate 4 which is, for instance, made of quartz and on which the heater 3 is mounted. The grating 2 is used for compensating the wavelength dispersion of a number of optical signals propagated through the optical fiber 1. As shown in FIG. 14, the optical fiber 1 is directly mounted on the heater 3 which is made of the thin film. (Page 1, lines 17-28).

Thus, prior art Fig. 14 from the specification merely discloses an optical fiber, a heater and a substrate. Nothing in Applicants' admitted prior art shows, teaches or suggests a) a first positioning mark provided on a substrate and a second mark

provided on the optical fiber which are used for positioning a grating on the substrate as claimed in claim 1 or b) a first positioning mark provided on the substrate and a second positioning mark provided on the optical fiber which are used for positioning a grating with respect to a heater as claimed in claims 3 and 13.

Chamberlain et al. is directed to the control of optical properties of an optical fiber device by thermal manipulation. (Column 1, lines 7-9). A thermally tunable optical device includes an optical fiber device 12. (Column 3, lines 55-65). As depicted in FIG. 1, the tunable optical device 10 includes a heater 14. The heater 14 includes a metal layer 18 and a first electrical contact 20 and a second electrical contact 22 that are spaced apart from one another. The metal layer 18 is a thin metallic film coated onto the surface of an optical fiber device 12. (Column 3, lines 55-65). As shown in FIG. 2, the tunable optical device may be mounted to a substrate 42. The optical fiber device 12 is tensioned and attached to a substrate 42 that has two metallized strips 44 forming an assembly 46. The substrate 42 is a zero-expansion material, typically a ceramic, glass or glass-ceramic. (Column 4, lines 27-32). Tensioning the optical fiber device 12 ensures that when the optical fiber device 12 is a fiber Bragg grating that the grating portion 50 of the optical fiber device 12 remains straight throughout the range of operating temperatures. When the optical fiber device 12 is a fiber Bragg grating and the substrate 42 is an ultra-low expansion material, neither the grating temperature nor the ambient temperature influences the total length of the grating 50. (Column 4, lines 36-43). In an alternate embodiment of the invention, as shown in FIG. 3, the heater 14 includes a metal layer 18 deposited on the sides of a groove 34 in a substrate 32. The substrate may be silica, glass or another material chosen to obtain specified thermal response

characteristics. Exemplary of this embodiment is the tunable optical device 10 shown in FIG. 4, this embodiment includes a slotted heater 36 in which the substrate 42 is a capillary tube with an axial bore 62 larger than the diameter of the optical fiber device 12. (Column 4, lines 54-63). In a typical embodiment, the region between the metal layer 18 and the optical fiber device 12 is filled with a hybrid organic/inorganic, glass or glass-ceramic material produced by a sol-gel process. (Column 5, lines 13-20).

Thus, *Chamberlain et al.* merely discloses a sol-gel process used to make a glass or ceramic material that fills a region between a metal layer 18 and an optical device 12. Nothing in *Chamberlain et al.* shows, teaches or suggests a) first and second positioning marks provided on a substrate and optical fiber which are used for positioning a grating on the substrate as claimed in claim 1 or b) first and second positioning marks provided on the substrate and optical fiber which are used for positioning a grating with respect to a heater as claimed in claims 3 and 13. Rather, *Chamberlain et al.* merely discloses a sol-gel process.

Lauzon et al. discloses apparatus and a method for chirping a grating using a temperature gradient. (col. 1, lines 8-9) More particularly, it discloses positioning an optical fiber 1 in a groove 4 of a brass plate 3 which is heated by peltier effect plates 6, 7, 11 and 12.

Thus, *Lauzon et al.* merely discloses positioning an optical fiber in a groove of a brass plate. Nothing in *Lauzon et al.* shows, teaches or suggests a) first and second positioning marks provided on a substrate and optical fiber which are used for positioning a grating on the substrate as claimed in claim 1 or b) first and second positioning marks provided on the substrate and optical fiber which are used for positioning a grating on a heater as claimed in claims 3 and 13. Rather, the optical

fiber of *Lauzon et al.* is positioned in a groove of a plate (i.e., no positioning marks are needed).

Koyabu et al. appears to disclose V grooves 2 are formed in a V grooved substrate 1 made of Si single crystal by antisotropic etching, and optical fibers 3 are held in V grooves 2. Positions in the Z direction of cores 4 of optical fibers to the surface of the substrate are determined with a high precision. An $LiNbO_3$ substrate 5 is so constituted that its surface where optical waveguides 6 are formed and the surface of the substrate 1 where V grooves 2 are formed are brought into contact with each other. Both surfaces are polished surfaces, and positions of optical waveguides 6 in the Z direction to the surface of the substrate 1 are accurately determined. Alignment marks of substrates 1 and 5 are used to position them in X and Y directions with a high precision. Two substrates are adhered and fixed to each other with an adhesive obtained from grooves 7.

Thus, *Koyabu et al.* merely discloses aligning marks in order to align substrates 1 and 5. Nothing in *Koyabu et al.* shows, teaches or suggests a) a first positioning mark provided on a substrate and a second positioning mark provided on an optical fiber used for positioning a grating on the substrate as claimed in claim 1 or b) a first positioning mark on a substrate and a second positioning mark provided on the optical fiber used for positioning a grating with respect to a heater as claimed in claims 3 and 13. Rather, *Koyabu et al.* merely discloses aligning marks in order to align substrates 1 and 5.

Since nothing in the prior art, *Chamberlain et al., Lauzon et al.* or *Koyabu et al.* shows, teaches or suggests a) a first positioning mark provided on a substrate and a second positioning mark provided on an optical fiber which are used for

positioning a grating on a substrate as claimed in claim 1 or b) a first positioning mark provided on a substrate and a second positioning mark provided on an optical fiber which are used for positioning a grating with respect to a heater as claimed in claims 3 and 13, Applicants respectfully request the Examiner withdraws the rejection to claims 1, 3 and 13 under 35 U.S.C. §103.

Claims 2, 4-6 and 9-12 depend from claims 1 and 3 and recite additional features. Applicants respectfully submit that claims 2, 4-6 and 9-12 would not have been obvious over the admitted prior art, *Chamberlain et al.*, *Lauzon et al.* or *Koyabu et al.* at least for the reasons as set forth above. Therefore, Applicants respectfully request the Examiner withdraws the rejection to claims 2, 4-6 and 9-12 under 35 U.S.C. §103.

Thus it now appears that the application is in condition for reconsideration and allowance. Reconsideration and allowance at an early date are respectfully requested. Should the Examiner find that the application is not now in condition for allowance, Applicants respectfully request the Examiner enters this Amendment for purposes of appeal.

If for any reason the Examiner feels that the application is not now in condition for allowance, the Examiner is requested to contact, by telephone, the Applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed within the currently set shortened statutory period, Applicants respectfully petition for an appropriate extension of time. The fees for such extension of time may be charged to our Deposit Account No. 02-4800.

In the event that any additional fees are due with this paper, please charge our Deposit Account No. 02-4800.

Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY PC

Date: May 9, 2007

By: _____
Ellen Marcie Emas
Registration No. 32131

P.O. Box 1404
Alexandria, Virginia 22313-1404
(703) 836-6620